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(54)【考案の名称】 湿度センサ

1

【実用新案登録請求の範囲】

【請求項1】表裏両面に電極を形成した板状の感湿素子と、モールド樹脂からなる台座を介してそれぞれ対向方向に突出した一方側を一對の断面U字形素子支持部とし、他方側を横断面が少なくとも一つの曲がり構造となる一對のリードピン部としたステムを具備し、前記一對の断面U字形素子支持部に前記感湿素子を挟持し、前記電極と前記素子支持部を電気的に接続したことを特徴とする湿度センサ。

【請求項2】請求項(1)記載の湿度センサを、内面に該合部を設け内外面に連なる少なくとも1本以上のスリット状貫通孔からなり、かつこの貫通孔に対向した内面側に隔壁を設けた縦割2分割嵌込み形外装ケース一対間に収納したことを特徴とする湿度センサ。

【考案の詳細な説明】

2

【考案の目的】

(産業上の利用分野)

本考案は、外装構造を改良した湿度センサに関する。

(従来の技術)

一般に、湿度センサは相対湿度の変化を電気抵抗の変化として検出するので、すばやい応答速度を確保するため電極面の気孔を防ぎ度合を最小限に止め、感湿素子両面に形成した電極面の有効面積を最大限確保することが要請されている。

従来、このような要請に応えた湿度センサとしては、例えば第14図に示すように、セラミック粉末を円板状に成形焼結してなる感湿素子21の表裏両面に導電性電極剤ペーストを塗布・焼付けし電極22を形成し、前記感湿素子21の相対する外周部をステム23を構成するリードピン24を接続した第15図に示すように貫通孔2

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5を設けた素子支持体26一対を用い前記電極22と前記素子支持体26と接続したステム23を構成するコパール（登録商標名）からなるリードピン24間をリード線27を介して接続したのち、正面及び背面に通気孔28を設けたケース29に収納し、このケース29開口段部に接着剤を介して前記ステム23を当接し固着した後ケース29開口部に封口樹脂30を充填してなるものである。31はステム23を構成するコパールなどからなる台座で、32はリードピン貫通孔で、台座31との短絡を防ぐためリードピン24の太さより大きく構成されており、33は台座31内に充填した絶縁体で、リードピン24及び台座31と同じ程度の熱膨張係数をもつガラスから構成されている。

しかしながら、上記のような構成になる湿度センサは、外装構造が複雑で実用上多くの問題をかかえていた。すなわち、ステム23構造に多くの部品点数を要し、かつ台座31及びリードピン24がコパールからなり、台座31内に充填する絶縁体がガラスで構成されているため、湿度センサとして高価にならざるを得ず、また、ステム23とケース29の一体化構成として接着剤塗布・固化及び封口樹脂30の充填・硬化工程を必要とするため作業性が良くなかった。

また、このような構成になる湿度センサのケース29に設けた通気孔部28構成は、第16図に示すように、貫通孔34部にメッシュフィルタ35を配設し、前記このメッシュフィルタ35の上にケース29と同材質からなるリング36を当接して押し込んだものからなっているが、製品化された後の取扱い時リードピン24でメッシュフィルタ35を破損させたり、又はメッシュフィルタ35の破損にとどまらず感湿素子21をも破損させる危険性を有していた。

また、使用中、油やゴミの付着によるメッシュフィルタ35の目詰まり現象により正確な湿度検出ができなくなる欠点を有していた。

更に、通気孔部28構成を作業面でみた場合部品点数も多く、メッシュフィルタ35配設作業に多くの工程を要し、作業性に問題があり、低価格化の市場要求の阻害要因となっており、加えて、メッシュフィルタ35の固着手段として接着剤を用いるため、周辺への接着剤付着による商品価値の低下はもとより、メッシュフィルタ35の不必要部への接着剤付着は、メッシュフィルタ35の通気孔部28としての機能の阻害要因となり、湿度センサの信頼性に問題をかかえる結果となっていた。

（考案が解決しようとする課題）

以上のように従来の湿度センサは、ステム構成が複雑で作業性に問題があると同時に、構成部品自体が多く、かつ構成部品自体比較的高いものを用いているため、湿度センサとして高価なものにならざるを得なかった。

また、通気孔をメッシュフィルタで構成しているため、

リードピンでメッシュフィルタ自体を破損させることはもとより、感湿素子をも破損させる危険性を有していた。

本考案は、上記の点に鑑みてなされたもので、その第1の目的は、ステム構成を改良することによって、低価格化の市場要求に応え得る湿度センサを提供するものであり、また、第2の目的は、ステム構成に加えケースに設ける通気孔構成を改良することによって、リードピンによる感湿素子破損の危険性を解消した湿度センサを提供するものである。

〔考案の構成〕

（課題を解決するための手段）

本考案の湿度センサは、モールド樹脂からなる台座を介してそれぞれ対向方向に突出した金属体の一方側を一对の断面U字形素子支持部とし、他方側を横断面が少なくとも一つの曲がり構造となる一对のリードピン部としたステムを用い、前記断面U字形素子支持部に表裏両面に電極を形成した板状の感湿素子をはさみ、前記電極と前記断面U字形素子支持部を接着したことを特徴とするものであり、また、上記構成になる感湿素子をステムとともに内外面に迫る少なくとも1本のスリット状貫通孔からなり、かつこのスリット状貫通孔に対向した内面側に隔壁を設けた一对の縦割2分割嵌込み形外装ケース間に収納したことを特徴とするものである。

（作用）

以上の構成による湿度センサによれば、ステム構成が従来のものと比較して単純であり、電極からの引出構造として電極と素子支持部を接着するものであるため、素子支持部として高価なコパールを使用する必要はなく、リン青銅、Fe-Ni合金、洋白、銅など、一般にリードフレームとして用いられている金属でよく、低価格化に寄与する。

また、ケースに設ける通気孔構成として、内外に迫るスリットからなっているため、通気は極めてよく、かつ、スリットに対向した内面側に隔壁が設けられているため、製品化された後における取扱い中、リードピン部がスリット部へ進入状態になったとしても隔壁の存在によりリードピン部はこれ以上中に進まず、感湿素子まで達することはない。

（実施例）

以下、本考案の詳細を一実施例に基づき図面を参照して説明する。すなわち、第1図～第3図に示すように、数種類の金属酸化物を混合し、例えば円板状に成形・焼結しその後研磨して感湿素子1を形成する。次に、この感湿素子1の表裏両面に金ペースト、銀ペースト又は酸化ルテニウムペーストを塗布焼付けし電極2を形成する。しかし、前記感湿素子1を第4図～第6図に示すように、モールド樹脂からなる台座3を介してそれぞれ対向方向に突出した、例えば、0.1～0.5mm厚さのリン青銅板の一方側を断面U字形素子支持部4とし、他方

側を第7図に示すように横断面がU状に曲がった構造となるリードピン部5としたステム6の前記断面U字形素子支持部4にはさみ込み、この素子支持部4と前記電極2当接部を例えば導電性ペースト7で接続し、しかる後外装ケース（図示せず）に収納してなるものである。8は位置決め穴である。

以上のように構成してなる湿度センサは、ステム6構成がモールド樹脂からなる台座3を介して断面U字形素子支持部4とリードピン部5それぞれが対向方向に突出されている、ごく単純なものであり、ステム6と感湿素子1の一体化も容易であり、ステム6自体の部品点数も少なくてよいのに加え、前記素子支持部4をリードピン部5と連続した従来のコパールと比較して安価なリン青銅板で構成されているため、ステム6のコスト低減が大幅にはかれ、市場要求の強い湿度センサの低価格化に大きく寄与することができる。

また、リードピン部5の横断面がU状に曲がった構造となっているため、薄い金属板を用いたとしてもソケットに挿入して使用する際のリードピン部5の変形による不具合が生じないものとなる。

次に、上記実施例に加え通気孔構成の改良した外装ケース構造について説明する。すなわち、第8図は以下説明する外装ケースを用いた完成された湿度センサを示すもので、上記実施例と同一部分については同一符号を付し説明を省略し、外装ケースに係る部分について第9図及び第10図を用いて説明する。

すなわち、合成樹脂からなり内面9上部の例えば2箇所に嵌合凸部10と嵌合凹部11を設け、内部9に素子収納凹部12を設け、かつ平面部に内外面に連なり外部に対して拡大するテーパー状を成した傾斜形状13からなるスリット状貫通孔14を設け、このスリット状貫通孔14に対向した内面側にスリット状貫通孔14の傾斜形状13部と接続した隔壁15を設けた縦割2分割嵌込み形外装ケース16一對を用い、この外装ケース16の内面同志を向かい合せ嵌合凸部10をそれぞれ相手方の嵌合凹部11に嵌合してなるものである。図中17は前記位置決め穴8に挿入する位置決め突起である。

以上の構成になる縦割2分割嵌込み形外装ケース16を用いた第8図に示す湿度センサによれば、前述の実施例によって得られる作用効果に加え、外装ケース16に設ける通気孔構成が特別な部品を付加することなく、合成樹脂の一体成形によって設けた内外面に連なるスリット状貫通孔14によって成されているため、作業性を考慮することなく、通気は極めて容易であり、目詰まりの心配もない。また、スリット状貫通孔14に対向した内面側に隔壁15が設けられているため、リードピン部5がスリット状貫通孔14に進入したとしても隔壁15の存在によって感湿素子1部に達することなく、感湿素子1破損に至る危険性は解消される。

更に、空気とともにほこりなどの異物がスリット状貫通

孔14内に入り込んだとしても隔壁15の存在によって感湿素子1に達することなく、かつスリット状貫通孔14が外部に対して拡大するテーパー状を成した傾斜形状13となっているため、結果として外部に排出されることになる作用効果を発揮できる。

なお、以上の実施例ではステム6を構成する断面U字形素子支持部4とリードピン部5は連続したリン青銅板を用いるものを例示して説明したが、それぞれを別個に形成し、台座3部内で接続してもよく、また、材料はリン青銅板に限定されるものではなく、その他Fe-Ni合金、洋白、銅など一般的にリードフレームとして用いられる金属を用いてもよく、更に、リードピン部の横断面形状も第7図のものに限定されることなく、例えば第11図及び第12図に示すように少なくとも一つの曲がり構造となっていれば同効である。

また、電極2と断面U字形素子支持部4との接続手段として導電性ペーストを介し両者を直接接合したものを例示したが、必要に応じリード線を介し溶接手段を用いてよいことはもちろんである。

20 外装ケース16に設けるスリット状貫通孔14構成として、必ずしも第9図及び第10図に示すように外部に対して拡大するテーパー状を成した傾斜形状13とする必要はなく、第13図に示すように内外面に扁平形状18となるスリット状貫通孔14としたものでも本発明の目的達成上問題はない。

また、スリット状貫通孔14の数は実施例に示した数に限定されることなく、必要に応じ適宜設定すればよい。

【考察の効果】

本発明によれば、ステム構成が単純で作業性良好にして低価格化の市場要求に応え得ると同時にソケットへの挿入作業が容易となるなど実用的価値の高い湿度センサが得られる。

また、外装ケースに設ける通気孔構成を改良することにより、上記効果に加えリードピン部による感湿素子破損の危険性がなく、信頼性の高い吸湿機能を常に発揮できるものとなる。

【図面の簡単な説明】

第1図～第7図は本発明の一実施例に係り、第1図～第3図は湿度センサを示し、第1図は正面図、第2図は左側面図、第3図は右側面図、第4図～第6図は第1図～第3図に示す湿度センサを構成するステムに係り、第4図は正面図、第5図は左側面図、第6図は右側面図、第7図は第4図A-A断面図、第8図～第10図は本発明の他の実施例に係り、第8図は湿度センサを示す斜視図、第9図は第8図を構成する縦割2分割嵌込み形外装ケースを示す斜視図、第10図は第9図に示す外装ケース一對を嵌込んだ状態を示す断面図、第11図及び第12図は本発明に係るステムを構成するリードピンそれぞれの他の実施例を示す横断面図、第13図は本発明の他の実施例に係る縦割2分割嵌込み形外装ケース一對を嵌

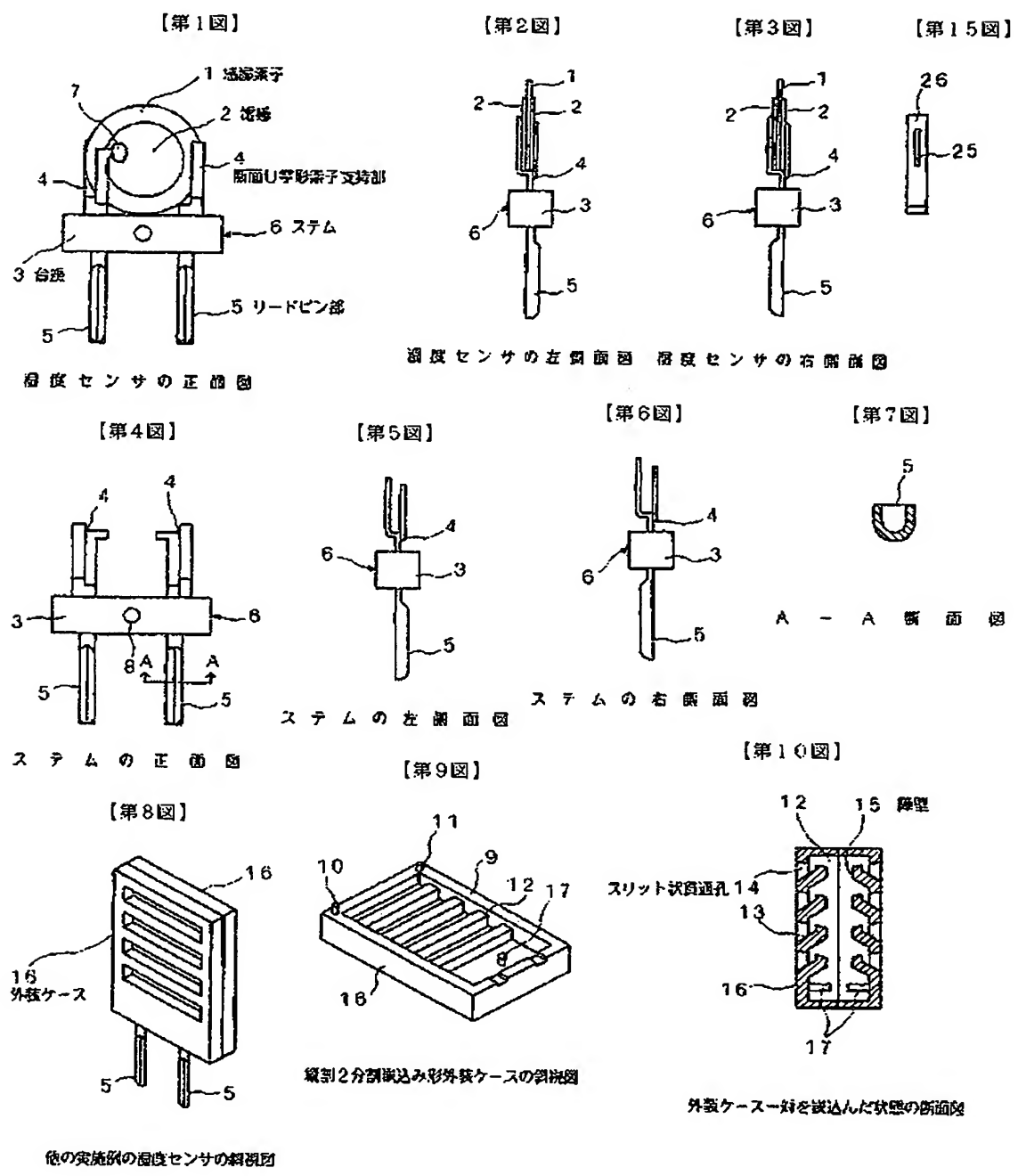
(4)

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込んだ状態を示す断面図。第14図は湿度センサを示す正断面図、第15図は第14図に示す湿度センサを構成する素子支持体を示す側面図、第16図は第14図に示す湿度センサを構成するケースを示す一部切欠断面図である。
1……感湿素子、2……電極

* 3……台座、4……断面U字形素子支持部
5……リードピン部、6……ステム
14……スリット状貫通孔
15……陪壁
16……縦割2分割嵌込み形外装ケース

*



(5)

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【第11図】



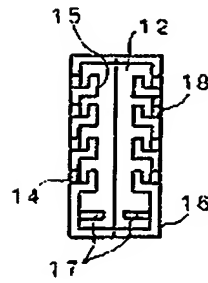
他の実施例のリードピン部の横断面図

【第12図】



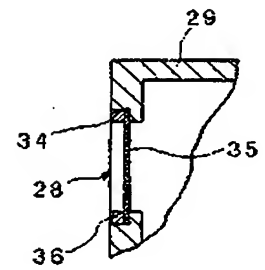
他の実施例のリードピン部の横断面図

【第13図】

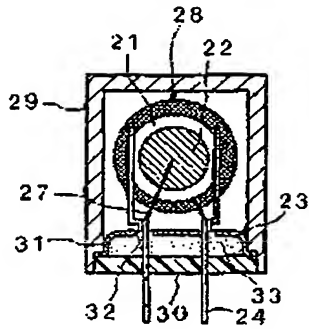


他の実施例の外装ケース対を収めた状態の断面図

【第16図】



【第14図】



フロントページの続き

(56)参考文献 特開 昭55-136946 (J P, A)
特開 平2-52248 (J P, A)

JAPANESE

[JP,06-031415,Y]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION
TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

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CLAIMS

[Utility model registration claim]

[Claim 1] The one side projected in the opposite direction through the tabular moisture sensitive device in which the electrode was formed to front flesh-side both sides, and the plinth which consists of mold resin, respectively is used as the cross-section U typeface component supporter of a pair. The humidity sensor characterized by having provided the stem which made the other side the lead pin section of the pair from which the cross section becomes at least one deflection structure, having pinched said moisture sensitive device to the cross-section U typeface component supporter of said pair, and connecting said component supporter with said electrode electrically.

[Claim 2] The humidity sensor characterized by containing between the vertical division 2 division insertion form sheathing case pairs which formed the obstruction in the inside side which consisted of at least one or more slit-like through tubes which prepare the fitting section in an inside and stand a humidity sensor given in a claim (1) in a row in an inside-and-outside side, and countered the through tube of a parenthesis.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed explanation of a design]

[The purpose of a design]

(Field of the Invention)

This design is related with the humidity sensor which improved sheathing structure.

(Prior art)

Generally, since a humidity sensor detects change of relative humidity as change of electric resistance, in order to secure a quick speed of response, the pore of an electrode surface is prevented, a degree is minimized, and it is requested that the maximum reservation of the effective area of the electrode surface formed in moisture sensitive device both sides should be carried out.

As a humidity sensor which responded to such a request conventionally For example, as shown in Fig. 14 , apply - burn a conductive electrode agent paste, and an electrode 22 is formed in front flesh-side both sides of the moisture sensitive device 21 which carries out shaping sintering of the ceramic powder disc-like, and becomes. It pinches and fixes to said through tube 25 section using component base material 26 pair which formed the through tube 25 as shown in Fig. 15 which connected the lead pin 24 which constitutes a stem 23 for the periphery section which said moisture sensitive device 21 faces. A deer is carried out and it contains in the case 29 which formed the air hole 28 in the transverse plane and the tooth back after connecting between the lead pins 24 which consist of covar (proprietary product name) which constitutes the stem 23 linked to said electrode 22 and said component base material 26 through lead wire 27, and after contacting and fixing said stem 23 through adhesives to this case 29 opening step, it comes to fill up case 29 opening obturation resin 30. 32 is a lead pin through tube, in order to prevent a short circuit with a plinth 31, it consists of sizes of the lead pin 24 greatly, and 31 is the plinth which consists of covar which constitutes a stem 23, and it consists of [33 is the insulator with which it was filled up in the plinth 31, and] glass with the coefficient of thermal expansion of same extent as the lead pin 24 and a plinth 31.

However, the humidity sensor which becomes the above configurations had complicated sheathing structure, and had many problems practically.

since [namely,] the insulator with which it is filled up in a plinth 31 by stem 23 structure's taking many components mark, and a plinth 31 and the lead pin 24 consisting of covar consists of glass -- as a humidity sensor -- expensive -- not becoming -- since it did not obtain and the restoration-hardening process of adhesives spreading-solidification and obturation resin 30 was needed as a unification configuration of a stem 23 and a case 29, workability was not good. Moreover, air hole section 28 configuration prepared in the case 29 of the humidity sensor which becomes such a configuration Although it consists of what arranged the mesh filter 35 in the through tube 34 section, and contacted and pushed in the ring 36 which consists of a case 29 and this quality of the material on said this mesh filter 35 as shown in Fig. 16 The mesh filter 35 was damaged by the lead pin 24 at the time of the handling after being produced commercially, or it had the danger of having not remained in breakage of the mesh filter 35, but also damaging a moisture sensitive device 21.

Moreover, it had during use the fault exact humidity detection becomes impossible according to the blinding phenomenon of the mesh filter 35 by adhesion of an oil and dust.

Furthermore, when air hole section 28 configuration is found by the working plane, there are also many components mark and a mesh filter 35 arrangement activity takes many processes to them. In order for a problem to be in workability, and to have become the inhibition factor of a commercial-scene demand of low-pricing, in addition to use

adhesives as a means for detachable of the mesh filter 35, From the first, adhesives adhesion in the unnecessary section of the mesh filter 35 became the inhibition factor of the function as the air hole section 28 of the mesh filter 35, and deterioration of the commodity value by adhesives adhesion to the circumference had resulted in holding a problem in the dependability of a humidity sensor.

(Technical problem which a design tends to solve)

As mentioned above, since the component part itself used many [and] high component part [itself] comparison things while a stem configuration is complicated and a problem is in workability, the conventional humidity sensor could not but become expensive as a humidity sensor.

Moreover, since the air hole was constituted from a mesh filter, it had the danger that not only the thing for which the mesh filter itself is damaged by the lead pin but also a moisture sensitive device made it damage.

The humidity sensor which also canceled the danger of the moisture sensitive device breakage by the lead pin is offered by having made this design in view of the above-mentioned point, and the 1st purpose's offering the humidity sensor which can meet the commercial-scene demand of low-pricing by improving a stem configuration, and improving the air hole configuration which prepares the 2nd purpose in a case in addition to a stem configuration.

[The configuration of a design]

(The means for solving a technical problem)

The humidity sensor of this design uses as the cross-section U typeface component supporter of a pair the one side of the metal body projected in the opposite direction through the plinth which consists of mold resin, respectively. The stem which made the other side the lead pin section of the pair from which the cross section becomes at least one deflection structure is used. Said cross-section U typeface component supporter pinches the tabular moisture sensitive device in which the electrode was formed to front flesh-side both sides. It is what is characterized by pasting up said electrode and said cross-section U typeface component supporter. Moreover, it consists of at least one slit-like through tube which stands in a row the moisture sensitive device which becomes the above-mentioned configuration in an inside-and-outside side with a stem, and is characterized by containing between the vertical division 2 division insertion form sheathing cases of the pair which formed the obstruction in the inside side which countered the slit-like through tube of a parenthesis.

(Operation)

According to the humidity sensor by the above configuration, it is not necessary to use covar expensive as a component supporter, and a stem configuration is simple as compared with the conventional thing, since it is what pastes up an electrode and a component supporter as drawer structure from an electrode, the metal generally used as a leadframe is sufficient as phosphor bronze, a Fe-nickel alloy, nickel silver, copper, etc., and they are contributed to low-pricing. Moreover, even if the lead-during the handling since [the obstruction was formed in the inside side which was very well ventilated since it consisted of a slit which stands in a row in and abroad as an air hole configuration prepared in a case, and countered the slit], and after being produced commercially pin section will be in a penetration condition to the slit section, the lead pin section does not go to inside any more by existence of an obstruction, and it does not reach to a moisture sensitive device.

(Example)

Hereafter, the detail of this design is explained with reference to a drawing based on one example. That is, as shown in Figs. 1 - 3, some kinds of metallic oxides are mixed, for example, to disc-like, it fabricates - sinters, it polishes after that, and a moisture sensitive device 1 is formed. Next, spreading printing of a golden paste, a silver paste, or the ruthenium oxide paste is carried out, and an electrode 2 is formed in front flesh-side both sides of this moisture sensitive device 1. Carried out the deer, and as shown in Figs. 4 - 6, projected said moisture sensitive device 1 in the opposite direction through the plinth 3 which consists of mold resin, respectively. For example, the one side of the phosphor bronze plate of 0.01-0.05mm thickness is used as the cross-section U typeface component supporter 4. The other side is inserted in said cross-section U typeface component supporter 4 of the stem 6 made into the lead pin section 5 from which the cross section serves as structure at which it turned in the shape of U as shown in Fig. 7. This component supporter 4 and said electrode 2 contact section are connected with the conductive paste 7, and it comes to contain in a sheathing case (not shown) after an appropriate time. 8 is a locating hole.

the plinth 3 which, as for the humidity sensor which it comes to constitute as mentioned above, stem 6 configuration becomes from mold resin -- minding -- the cross-section [of U characters]-like component supporter 4, and the lead pin section 5 -- each is projected and carried out in the opposite direction -- It is very simple and unification of a stem 6

and a moisture sensitive device 1 is also easy. Since the components mark of stem 6 the very thing also consist of cheap phosphor bronze plates as compared with the conventional covar which followed the lead pin section 5 in said component supporter 4 in addition to the thing which may be, The cost reduction of a stem 6 is measured sharply and can contribute to low-pricing of the powerful humidity sensor of a commercial-scene demand greatly.

Moreover, since the cross section of the lead pin section 5 has structure at which it turned in the shape of U, even if it uses a thin metal plate, the fault by deformation of the lead pin section 5 at the time of using it, inserting in a socket does not arise.

Next, the sheathing case structure which the air hole configuration improved in addition to the above-mentioned example is explained. Namely, Fig. 8 shows the completed humidity sensor using the sheathing case explained below, attaches the same sign about the same part as the above-mentioned example, omits explanation, and explains it using Figs. 9 and 10 about the part concerning a sheathing case.

Namely, consist of synthetic resin and the fitting heights 10 and the fitting crevice 11 are established in two places of the inside 9 upper part. The slit-like through tube 14 which consists of an inclination configuration 13 where the shape of a taper which establishes the component receipt crevice 12 in the interior 9, and is expanded to the flat-surface section to the exterior in an inside-and-outside side in a ream was accomplished is formed. Vertical division 2 division insertion form sheathing case 16 pair which established the obstruction 15 connected [through tube / 14 / this / slit-like] with the inclination configuration 13 section of the slit-like through tube 14 at the inside side which countered is used. It comes [comrade / of this sheathing case 16 / inside] to fit into the other party's fitting crevice 11 in the facing-each-other fitting heights 10, respectively. 17 in drawing is a locating lug inserted in said locating hole 8.

Aeration is very easy and does not have worries about blinding, without taking workability into consideration, since it has accomplished by the slit-like through tube 14 which stands in a row in the inside-and-outside side which established with one shaping of synthetic resin, without the air hole configuration which prepares in a sheathing case 16 adding [according to the humidity sensor shown in Fig. 8 using the vertical-division 2 division insertion form sheathing case 16 which becomes the above configuration] special components in addition to the operation effectiveness acquired according to the above-mentioned example. Moreover, since the obstruction 15 is formed in the inside side which countered the slit-like through tube 14, even if the lead pin section 5 advances into the slit-like through tube 14, the danger of not reaching the moisture sensitive device 1 section by existence of an obstruction 15, and resulting in moisture sensitive device 1 breakage is canceled.

Furthermore, though foreign matters, such as dust, enter in the slit-like through tube 14 with air, since it be the inclination configuration 13 where the shape of a taper which do not give to a moisture sensitive device 1 by existence of an obstruction 15, and the slit-like through tube 14 expand to the exterior be accomplished, the operation effectiveness which will be discharge outside as a result can be demonstrate.

In addition, although the cross-section U typeface component supporter 4 which constitutes a stem 6 from the above example, and the lead pin section 5 illustrated and explained the thing using the continuous phosphor bronze plate Each may be formed separately, and you may connect in the plinth 3 department, and an ingredient is not what is limited to a phosphor bronze plate. In addition, metals generally used as a leadframe, such as a Fe-nickel alloy, nickel silver, and copper, may be used. Furthermore, without also limiting the cross-section configuration of the lead pin section to the thing of Fig. 7 , if it has at least one deflection structure as shown, for example in the 11th drawing 1 Fig. and Fig. 12 , it is this effect.

Moreover, although what pasted both up directly through the conductive paste as a connecting means of an electrode 2 and the cross-section U typeface component supporter 4 was illustrated, of course, a welding means may be used through lead wire if needed.

as slit-like through tube 14 configuration prepare in the sheathing case 16, as show in Figs. 9 and 10 , it be necessary to necessarily consider as the inclination configuration 13 where the shape of a taper expand to the exterior be accomplished, and the purpose achievement top problem of this design do not have what be made into the slit-like through tube 14 which serve as the shape of ***** 18 in an inside and outside side as show in Fig. 13 .

Moreover, what is necessary is just to set up the number of the slit-like through tubes 14 suitably if needed, without being limited to the number shown in the example.

[Effect of the Device]

According to this design, while it is simple, and a stem configuration makes it workability fitness and can meet the commercial-scene demand of low-pricing, the high humidity sensor of practical value -- the insertion to a socket

becomes easy -- is obtained.

Moreover, by improving the air hole configuration prepared in a sheathing case, in addition to the above-mentioned effectiveness, there is no danger of the moisture sensitive device breakage by the lead pin section, and a reliable moisture absorption function can always be demonstrated.

[Translation done.]

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TECHNICAL FIELD

(Field of the Invention)

This design is related with the humidity sensor which improved sheathing structure.

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PRIOR ART

(Prior art)

Generally, since a humidity sensor detects change of relative humidity as change of electric resistance, in order to secure a quick speed of response, the pore of an electrode surface is prevented, a degree is minimized, and it is requested that the maximum reservation of the effective area of the electrode surface formed in moisture sensitive device both sides should be carried out.

As a humidity sensor which responded to such a request conventionally For example, as shown in Fig. 14 , apply - burn a conductive electrode agent paste, and an electrode 22 is formed in front flesh-side both sides of the moisture sensitive device 21 which carries out shaping sintering of the ceramic powder disc-like, and becomes. It pinches and fixes to said through tube 25 section using component base material 26 pair which formed the through tube 25 as shown in Fig. 15 which connected the lead pin 24 which constitutes a stem 23 for the periphery section which said moisture sensitive device 21 faces. A deer is carried out and it contains in the case 29 which formed the air hole 28 in the transverse plane and the tooth back after connecting between the lead pins 24 which consist of covar (proprietary product name) which constitutes the stem 23 linked to said electrode 22 and said component base material 26 through lead wire 27, and after contacting and fixing said stem 23 through adhesives to this case 29 opening step, it comes to fill up case 29 opening obturation resin 30. 32 is a lead pin through tube, in order to prevent a short circuit with a plinth 31, it consists of sizes of the lead pin 24 greatly, and 31 is the plinth which consists of covar which constitutes a stem 23, and it consists of [33 is the insulator with which it was filled up in the plinth 31, and] glass with the coefficient of thermal expansion of same extent as the lead pin 24 and a plinth 31.

However, the humidity sensor which becomes the above configurations had complicated sheathing structure, and had many problems practically.

since [namely,] the insulator with which it is filled up in a plinth 31 by stem 23 structure's taking many components mark, and a plinth 31 and the lead pin 24 consisting of covar consists of glass -- as a humidity sensor -- expensive -- not becoming -- since it did not obtain and the restoration-hardening process of adhesives spreading-solidification and obturation resin 30 was needed as a unification configuration of a stem 23 and a case 29, workability was not good. Moreover, air hole section 28 configuration prepared in the case 29 of the humidity sensor which becomes such a configuration Although it consists of what arranged the mesh filter 35 in the through tube 34 section, and contacted and pushed in the ring 36 which consists of a case 29 and this quality of the material on said this mesh filter 35 as shown in Fig. 16 The mesh filter 35 was damaged by the lead pin 24 at the time of the handling after being produced commercially, or it had the danger of having not remained in breakage of the mesh filter 35, but also damaging a moisture sensitive device 21.

Moreover, it had during use the fault exact humidity detection becomes impossible according to the blinding phenomenon of the mesh filter 35 by adhesion of an oil and dust.

Furthermore, when air hole section 28 configuration is found by the working plane, there are also many components mark and a mesh filter 35 arrangement activity takes many processes to them. In order for a problem to be in workability, and to have become the inhibition factor of a commercial-scene demand of low-pricing, in addition to use adhesives as a means for detachable of the mesh filter 35, From the first, adhesives adhesion in the unnecessary section of the mesh filter 35 became the inhibition factor of the function as the air hole section 28 of the mesh filter 35, and deterioration of the commodity value by adhesives adhesion to the circumference had resulted in holding a problem in the dependability of a humidity sensor.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Device]

According to this design, while it is simple, and a stem configuration makes it workability fitness and can meet the commercial-scene demand of low-pricing, the high humidity sensor of practical value -- the insertion to a socket becomes easy -- is obtained.

Moreover, by improving the air hole configuration prepared in a sheathing case, in addition to the above-mentioned effectiveness, there is no danger of the moisture sensitive device breakage by the lead pin section, and a reliable moisture absorption function can always be demonstrated.

[Translation done.]

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TECHNICAL PROBLEM

(Technical problem which a design tends to solve)

As mentioned above, since the component part itself used many [and] high component part [itself] comparison things while a stem configuration is complicated and a problem is in workability, the conventional humidity sensor could not but become expensive as a humidity sensor.

Moreover, since the air hole was constituted from a mesh filter, it had the danger that not only the thing for which the mesh filter itself is damaged by the lead pin but also a moisture sensitive device made it damage.

The humidity sensor which also canceled the danger of the moisture sensitive device breakage by the lead pin is offered by having made this design in view of the above-mentioned point, and the 1st purpose's offering the humidity sensor which can meet the commercial-scene demand of low-pricing by improving a stem configuration, and improving the air hole configuration which prepares the 2nd purpose in a case in addition to a stem configuration.

[The configuration of a design]

[Translation done.]

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MEANS

(The means for solving a technical problem)

The humidity sensor of this design uses as the cross-section U typeface component supporter of a pair the one side of the metal body projected in the opposite direction through the plinth which consists of mold resin, respectively. The stem which made the other side the lead pin section of the pair from which the cross section becomes at least one deflection structure is used. Said cross-section U typeface component supporter pinches the tabular moisture sensitive device in which the electrode was formed to front flesh-side both sides. It is what is characterized by pasting up said electrode and said cross-section U typeface component supporter. Moreover, it consists of at least one slit-like through tube which stands in a row the moisture sensitive device which becomes the above-mentioned configuration in an inside-and-outside side with a stem, and is characterized by containing between the vertical division 2 division insertion form sheathing cases of the pair which formed the obstruction in the inside side which countered the slit-like through tube of a parenthesis.

[Translation done.]

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OPERATION

(Operation)

According to the humidity sensor by the above configuration, it is not necessary to use cover expensive as a component supporter, and a stem configuration is simple as compared with the conventional thing, since it is what pastes up an electrode and a component supporter as drawer structure from an electrode, the metal generally used as a leadframe is sufficient as phosphor bronze, a Fe-nickel alloy, nickel silver, copper, etc., and they are contributed to low-pricing. Moreover, even if the lead-during the handling since [the obstruction was formed in the inside side which was very well ventilated since it consisted of a slit which stands in a row in and abroad as an air hole configuration prepared in a case, and countered the slit], and after being produced commercially pin section will be in a penetration condition to the slit section, the lead pin section does not go to inside any more by existence of an obstruction, and it does not reach to a moisture sensitive device.

[Translation done.]

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EXAMPLE

(Example)

Hereafter, the detail of this design is explained with reference to a drawing based on one example. That is, as shown in Figs. 1 - 3, some kinds of metallic oxides are mixed, for example, to disc-like, it fabricates - sinters, it polishes after that, and a moisture sensitive device 1 is formed. Next, spreading printing of a golden paste, a silver paste, or the ruthenium oxide paste is carried out, and an electrode 2 is formed in front flesh-side both sides of this moisture sensitive device 1. Carried out the deer, and as shown in Figs. 4 - 6, projected said moisture sensitive device 1 in the opposite direction through the plinth 3 which consists of mold resin, respectively. For example, the one side of the phosphor bronze plate of 0.01-0.05mm thickness is used as the cross-section U typeface component supporter 4. The other side is inserted in said cross-section U typeface component supporter 4 of the stem 6 made into the lead pin section 5 from which the cross section serves as structure at which it turned in the shape of U as shown in Fig. 7. This component supporter 4 and said electrode 2 contact section are connected with the conductive paste 7, and it comes to contain in a sheathing case (not shown) after an appropriate time. 8 is a locating hole.

the plinth 3 which, as for the humidity sensor which it comes to constitute as mentioned above, stem 6 configuration becomes from mold resin -- minding -- the cross-section [of U characters]-like component supporter 4, and the lead pin section 5 -- each is projected and carried out in the opposite direction -- It is very simple and unification of a stem 6 and a moisture sensitive device 1 is also easy. Since the components mark of stem 6 the very thing also consist of cheap phosphor bronze plates as compared with the conventional covar which followed the lead pin section 5 in said component supporter 4 in addition to the thing which may be, The cost reduction of a stem 6 is measured sharply and can contribute to low-pricing of the powerful humidity sensor of a commercial-scene demand greatly.

Moreover, since the cross section of the lead pin section 5 has structure at which it turned in the shape of U, even if it uses a thin metal plate, the fault by deformation of the lead pin section 5 at the time of using it, inserting in a socket does not arise.

Next, the sheathing case structure which the air hole configuration improved in addition to the above-mentioned example is explained. Namely, Fig. 8 shows the completed humidity sensor using the sheathing case explained below, attaches the same sign about the same part as the above-mentioned example, omits explanation, and explains it using Figs. 9 and 10 about the part concerning a sheathing case.

Namely, consist of synthetic resin and the fitting heights 10 and the fitting crevice 11 are established in two places of the inside 9 upper part. The slit-like through tube 14 which consists of an inclination configuration 13 where the shape of a taper which establishes the component receipt crevice 12 in the interior 9, and is expanded to the flat-surface section to the exterior in an inside-and-outside side in a ream was accomplished is formed. Vertical division 2 division insertion form sheathing case 16 pair which established the obstruction 15 connected [through tube / 14 / this / slit-like] with the inclination configuration 13 section of the slit-like through tube 14 at the inside side which countered is used. It comes [comrade / of this sheathing case 16 / inside] to fit into the other party's fitting crevice 11 in the facing-each-other fitting heights 10, respectively. 17 in drawing is a locating lug inserted in said locating hole 8.

Aeration is very easy and does not have worries about blinding, without taking workability into consideration, since it has accomplished by the slit-like through tube 14 which stands in a row in the inside-and-outside side which established with one shaping of synthetic resin, without the air hole configuration which prepares in a sheathing case 16 adding [according to the humidity sensor shown in Fig. 8 using the vertical-division 2 division insertion form sheathing case 16 which becomes the above configuration] special components in addition to the operation

effectiveness acquired according to the above-mentioned example. Moreover, since the obstruction 15 is formed in the inside side which countered the slit-like through tube 14, even if the lead pin section 5 advances into the slit-like through tube 14, the danger of not reaching the moisture sensitive device 1 section by existence of an obstruction 15, and resulting in moisture sensitive device 1 breakage is canceled.

Furthermore, though foreign matters, such as dust, enter in the slit-like through tube 14 with air, since it be the inclination configuration 13 where the shape of a taper which do not give to a moisture sensitive device 1 by existence of an obstruction 15, and the slit-like through tube 14 expand to the exterior be accomplished, the operation effectiveness which will be discharge outside as a result can be demonstrate.

In addition, although the cross-section U typeface component supporter 4 which constitutes a stem 6 from the above example, and the lead pin section 5 illustrated and explained the thing using the continuous phosphor bronze plate Each may be formed separately, and you may connect in the plinth 3 department, and an ingredient is not what is limited to a phosphor bronze plate. In addition, metals generally used as a leadframe, such as a Fe-nickel alloy, nickel silver, and copper, may be used. Furthermore, without also limiting the cross-section configuration of the lead pin section to the thing of Fig. 7 , if it has at least one deflection structure as shown, for example in the 11th drawing 1 Fig. and Fig. 12 , it is this effect.

Moreover, although what pasted both up directly through the conductive paste as a connecting means of an electrode 2 and the cross-section U typeface component supporter 4 was illustrated, of course, a welding means may be used through lead wire if needed.

as slit-like through tube 14 configuration prepare in the sheathing case 16, as show in Figs. 9 and 10 , it be necessary to necessarily consider as the inclination configuration 13 where the shape of a taper expand to the exterior be accomplished, and the purpose achievement top problem of this design do not have what be made into the slit-like through tube 14 which serve as the shape of ***** 18 in an inside and outside side as show in Fig. 13 .

Moreover, what is necessary is just to set up the number of the slit-like through tubes 14 suitably if needed, without being limited to the number shown in the example.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

Apply Figs. 1 - 7 to one example of this design, and Fig. 1 - the 3rd drawing 3 Fig. show a humidity sensor. Fig. 1 is applied to the stem which constitutes the humidity sensor which a front view and Fig. 2 show a right side view and Figs. 4 - 6 in a left side view, and shows Fig. 3 in Figs. 1 - 3 . In a left side view and Fig. 6 , a front view and Fig. 5 a right side view and the 7th drawing 7 Fig. A 4th [**] Fig. A-A sectional view, [a 4th / ** / Fig. R> Fig.] The perspective view in which applying Figs. 8 - 10 to other examples of this design, and showing [8] a humidity sensor, The perspective view showing the vertical division 2 division insertion form sheathing case where Fig. 9 constitutes Fig. 8 , The sectional view showing the condition that Fig. 10 inserted in the sheathing case pair shown in Fig. 9 , The cross-sectional view showing other examples of each lead pin which constitutes the stem which Fig. 11 and the 12th drawing 2 Fig. require for this design, The sectional view showing the condition that Fig. 13 inserted in the vertical division 2 division insertion form sheathing case pair concerning other examples of this design, applying Fig. 14th-16 to the conventional example, the forward sectional view showing [14] a humidity sensor, the side elevation showing the component base material which constitutes the humidity sensor which shows Fig. 15 in Fig. 14 , and Fig. 16 show the case which constitutes the humidity sensor shown in Fig. 14 -- it is a notching sectional view a part.

- 1 A moisture sensitive device, 2 .. Electrode
- 3 A plinth, 4 .. Cross-section U typeface component supporter
- 5 The lead pin section, 6 .. Stem
- 14 Slit-like through tube
- 15 Obstruction
- 16 Vertical division 2 division insertion form sheathing case

[Translation done.]

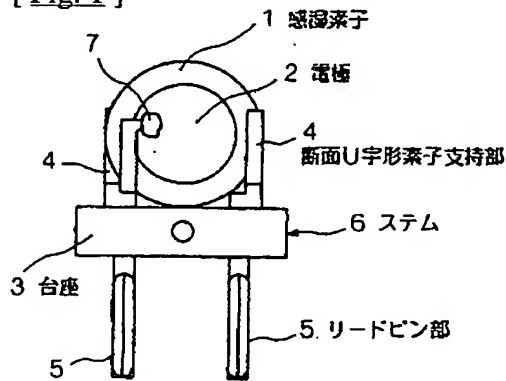
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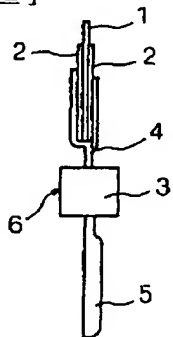
DRAWINGS

[Fig. 1]



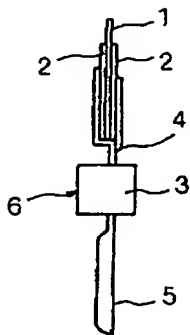
湿度センサの正面図

[Fig. 2]



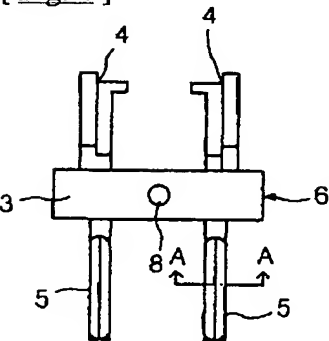
湿度センサの左側面図

[Fig. 3]



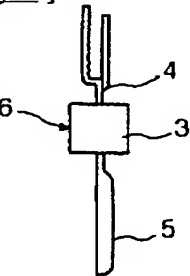
湿度センサの右側面図

[Fig. 4]



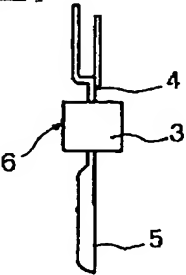
ステムの正面図

[Fig. 5]



ステムの左側面図

[Fig. 6]



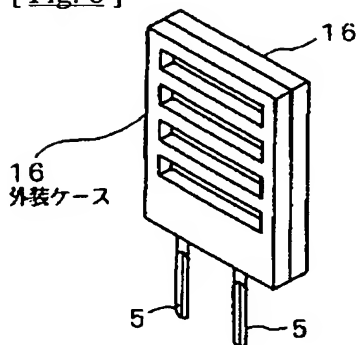
ステムの右側面図

[Fig. 7]



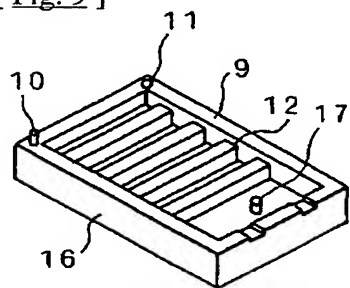
A - A 断面図

[Fig. 8]



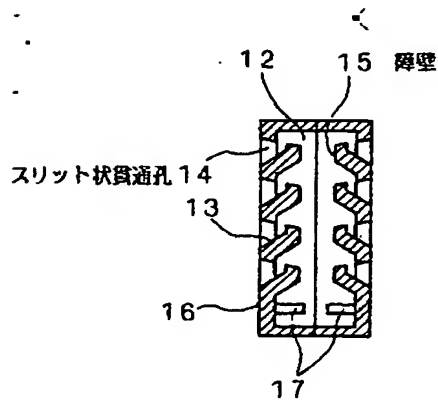
他の実施例の湿度センサの斜視図

[Fig. 9]



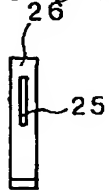
縦割2分割嵌込み形外装ケースの斜視図

[Fig. 10]



外装ケース一対を嵌込んだ状態の断面図

[Fig. 15]



[Fig. 11]



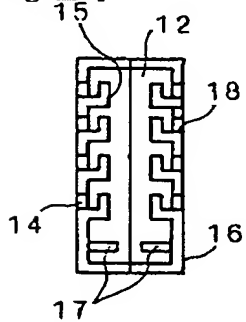
他の実施例のリードピン部の横断面図

[Fig. 12]



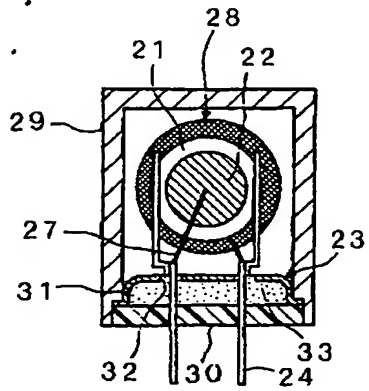
他の実施例のリードピン部の横断面図

[Fig. 13]

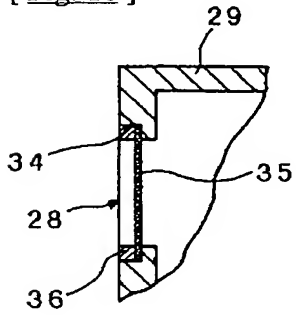


他の実施例の外装ケース一対を嵌込んだ状態の断面図

[Fig. 14]



[Fig. 16]



[Translation done.]

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